HELENA MONTANA

QUEEN CITY OF THE ROCKIES

Helena Water Facilities Plan

CHAPTER 9 – RECOMMENDED PLAN

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Introduction

In Chapter 6, alternative approaches to capital improvements at the water treatment plants were identified and evaluated as if the City plants maintained their current roles. In Chapter 7, the disinfection system was reviewed. In Chapter 8, reversal of roles for the City's two main water supplies was analyzed.

Recommended Plan

In the recommended plan, City supply will be treated at the City's two main treatment facilities, MRTP and TTP. The Hale Zone system will ultimately be abandoned. Groundwater was deemed not viable as a long-term source of supply based on unsuccessful efforts to develop municipal wells in 1998, the impact a large municipal well may have on surrounding wells, the potential costs involved in treating for arsenic and radon, and the potential negative impact of mixing groundwater and surface water in the distribution system.

It is recommended that the MRTP be improved to improve reliability and provide the larger portion of the City's water supply. The plan includes phased improvements to MRTP to allow use of grants and matching funds as they become available. In addition, the plan includes the addition of two storage reservoirs (one on the west end and one in the low zone) two new pump stations (one to the north and one at the low zone reservoir), extension of service to serve growth to the north and east, and improvements to the existing system to correct fire flow deficiencies.

The City will maintain its two water treatment plants and its water rights at both the MRTP and TTP. In so doing, it will participate in costs to make the following significant improvements to MRTP:

- New transfer pump station, high zone pump station and clearwell ($3,400,000)
- New pretreatment with DAF ($3,900,000)
- Raw water pump station and intake ($4,500,000)
- Support facilities ($2,600,000)

The existing capacity of the MRTP is limited to 7 MGD by the disinfection process. Filtration capacity is 13 MGD. As facilities are designed they will be designed for 13 MGD to meet the 2025 City demand of 21 MGD; with 8 MGD produced at TTP and 13 MGD at MRTP.

New transfer pump station, high zone station and clearwell

Currently the MRTP capacity is limited by disinfection capacity. Increased reliance on MRTP as the City grows, and makes this project critical to the City ability to meet current and future demands. Constructing this project increases the plant pumping capacity to 13 MGD, to meet the 2025 maximum day demand.

New Pretreatment with DAF

The current pretreatment is ineffective and limits filtration capacity. Even with large alum doses, turbidities onto the filters are the same or exceed raw water turbidities. A dissolved

air flotation (DAF) process would fit in the existing pretreatment building and was the most cost-effective method to improve pre-treatment.

Raw Water Pump Station and Intake

The gravity capacity of the existing MRTP raw water transmission main is 12 MGD at full pool, 9 MGD at low pool. The 2025 design flow for MRTP is 13 MGD. If Helena Valley Irrigation District adjusts its management of the reservoir such that full pool is not maintained during the summer months, or the demand at MRTP exceeds 12 MGD, this project will move forward.

Support Facilities

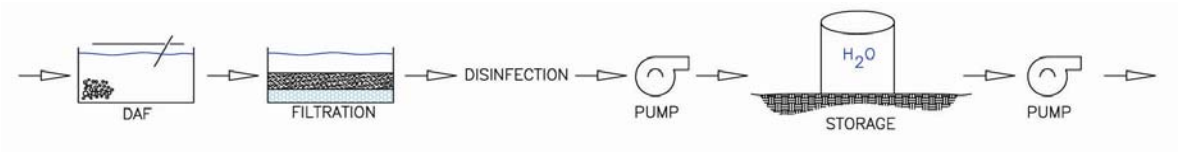
The MRTP standby power, PLCs, controls, and chemical feed facilities need to be upgraded. Improving these facilities will ensure the long-term reliability for MRTP.

Other Improvements

Other smaller scale improvements are recommended at TTP and MRTP are discussed in detail in Chapter 6.

The anticipated process schematic following completion of all the improvements is shown in Figure 9-1. It is anticipated that the treatment plant projects will be implemented as grants and funding allows.

Figure 9-1 MRTP Process Schematic



Distribution

The goal for water distribution is to provide adequate fire flows and to serve growth, through storage reservoirs, pump stations and the addition or replacement of water lines. Fire flow analyses were based on criteria established and approved by the City. Future flows were based on 20 year and buildout flow projections.

Storage

The recommended plan includes construction of two new storage reservoirs out in the distribution system (in additional to clearwell construction at MRTP), one in the low zone, one on the west side.

Pump Stations

The recommended plan includes improvements to Dahlhausen (in addition to a new high service station at MRTP) and two new pump stations (one on the west end, one to the north).

Fire Flow Improvements

Numerous projects, totaling 28 miles of water line, are identified to improve fire flows around the City. The projects are described by service area and include the area around the

airport, the area around Carroll College, the Hale Zone, West Side, Central Helena and the Area in the vicinity of the railroad.

Extensions to Serve Growth

Major system extensions will be to the north as the service areas grows. Three main lines are proposed to serve this area; a 12-inch along Glass Drive, a 16-inch along Montana Avenue and 12-inch on McHugh Lane continuing to Dairy Drive. The Lower Malben-Woolston Zone would be served by a 16-inch along Green Meadow and a 12-inch across Valley View Road.

Distribution Plan Summary

Figure 9-2 shows the general location of the improvements that are recommended. Several distribution improvements will be needed to implement the recommended plan.

The top ten projects are listed below (a complete list is given in Chapter 7):

- Obtain a site for Lower Malben-Woolston Reservoir. ($150,000)
- MRTP Low Zone Pumping ($120,000)
- Connect Airport to Low Zone ($450,000)
- Carter & Highway 12 ($100,000)
- PRV Telemetry ($150,000)
- Paralleling 20-inch line south of Airport ($1,200,000)
- Connect Forrest Estates to Reeder's Village ($900,000)
- Connect Hale Zone to Winne Zone ($520,000)
- West Side Reservoir ($2,100,000)
- Upgrade/Replace Dalhausen Pump Station ($1,200,000)

Obtain a site for Lower Malben-Woolston Reservoir

New storage in the Lower Malben-Woolston pressure zone would not only help meet storage needs, but as this zone and the Valley Zone have higher demands, pumping from the MRTP will become more common and desirable. Having a reservoir would benefit operations because the pumps could operate on reservoir level instead of pumping into a closed system. Securing a site for this reservoir in the near term is recommended.

MRTP Low Zone Pumping

The low zone pump station has not been used since its construction in 1982 due to low demands and feeding of the low zone from the Upper Malben-Wooston Zone. It is recommended that adjusting the PRV setting between the high and low zone be investigated in conjunction with addition of a VFD to the low zone pumps. This addition could be made in conjunction with the clearwell and pump station project at MRTP.

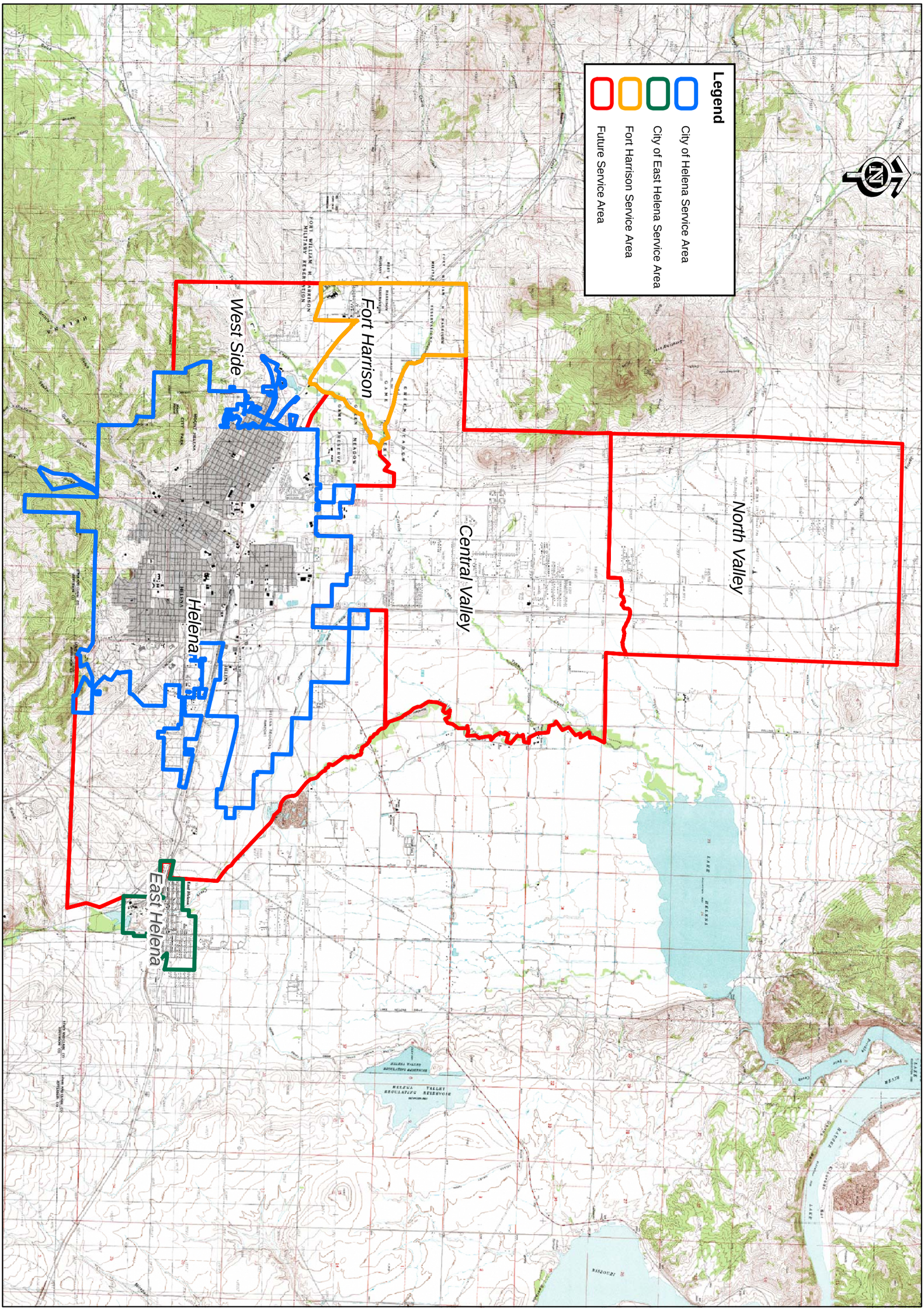


Figure 9-2
Distribution Improvement Summary

City of Helena
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Connect Airport to Low Zone

The finished water line from the MRTP site experiences high pressures (200 to 300 psi). Providing a connection from the airport directly to the low zone would alleviate those high pressures and provide a redundant feed point to the low zone.

Carter and Highway 12

The area east of the Carter Street and Highway 12 intersection is also prone to high pressure surges from the pumps turning on at the MRTP. Two PRVs on the two 8-inch lines would help alleviate this situation.

Pressure Reducing Valve (PRV) Telemetry

There is currently no way to monitor the PRVs in the distribution system to ensure reasonable pressures are maintained throughout the system. Adding telemetry at PRVs would allow monitoring of their operation and permit staff to better respond to problems.

Paralleling 20-inch line south of Airport

The 20-inch line south of the Airport is the primary supply of water to the High Zone. Paralleling the 20-inch with a 24-inch would reduce the pressures and save energy, and provide some system redundancy.

Connect Forrest Estates to Reeder's Village

Allows continued use of Forrest Estates and lowers elevated pressures along LaGrande Cannon Boulevard.

Connect Hale Zone to Winne Zone

The classification of the Orofino source as under the influence of surface water will require another method to feed the Hale Zone. This project will provide another connection to the zone and improve system redundancy.

West Side Reservoir

Construction of a west side reservoir would eliminate the closed loop (no storage) system for Forrest Estates area. In addition, potential growth to the southwest and Reeder's Village could be served with an interconnect between Forrest Estates and Reeder's Village is constructed.

Upgrade/Replace Dalhausen Pump Station

Upgrade of the Dahlhausen pump station would provide more storage (allowing full use of the Malben storage) and with backup power would improve system redundancy.

Cost Estimate

Table 9-1 summarizes the estimated capital costs of the recommended plan. Costs are presented in 2005 dollars. All costs presented are preliminary planning-level estimates and are subject to change as the implementation process proceeds and facility requirements become more refined.

Table 9-1 Summary of Recommended Plan Estimated Costs

Treatment Plant Improvements		
MRTP		
	Raw Water Intake and Pump Station	$4,500,000
	New Pretreatment with DAF	$3,900,000
	New Disinfection*	$350,000
	New Clearwell and Pump Station	$3,400,000
	Support Facilities	$2,600,000
TTP		
	Solar Aerators	$150,000
	Filter Media Replacement	$150,000
	Replace Backwash Pump Station	$800,000
	Replace Gas Chlorine System	$200,000
Total Estimated Cost for Treatment Plant Improvements		*$16,050,000*
Distribution System Improvements		
Obtain a site for Lower Malben-Woolston Reservoir.		$150,000
MRTP Low Zone Pumping		$120,000
Connect Airport to Low Zone		$450,000
Carter & Highway 12		$100,000
PRV Telemetry		$150,000
Paralleling MRTP Discharge		$1,200,000
Connect Forrest Estates to Reeder's Village		$910,000
Connect Hale Zone to Winne Zone		$520,000
West Side Reservoir		$2,100,000
Upgrade/Replace Dalhausen Pump Station		$1,200,000
Valley Zone PRVs		$150,000
Southwest Piping Improvements		$4,400,000
Hale Zone Piping Improvements		$3,400,000
Upgrade piping to new reservoir site.		$2,000,000[a]
New Lower Malben-Woolston Reservoir		$3,500,000
Connect West Main to Reeder's Village, Upsize Piping, Connect Reeder's to Hale.		$200,000
Miscellaneous Fire Flow Projects		$14,250,000
Low priority piping pump station projects		$1,200,000
Total Estimated Cost for Distribution Improvements		*$36,000,000*
Water System Extension Projects		*$25,000,000*

*Assumes liquid chlorine is chosen.

System Development Fee Review

A preliminary review of the City's existing system development fees is included in Appendix 9-A. The review includes a comparison of the City's fees with other Montana cities, discusses the existing system development fee ordinance, and recommends additional review.

Appendix 9-A

System Development Fee Review

Introduction

The purpose of this section is to develop a review of the City's system development fees. Key issues include the ability of those fees to cover capital infrastructure costs, comparison of fees to other Montana water utilities and a review of the City's existing system development fee ordinance. Capital improvements targeted toward growth are summarized.

The existing utilities are funded through user charges that pay for on-going operations and maintenance expenses and facility improvements. The financial analysis included in the Facilities Plan is limited in scope to review of the system development fees.

Existing Water System Development Fees

Current system development fees were set in 1986 and have not been adjusted since then. The current system uses is a buy-in approach where new development makes a capital investment equal to that made by the current ratepayers. New customers and then considered "on par" with existing customers and all customers (existing and future) would share in the costs of future facilities.

Connection fees for new water customers are based upon the meter size of the service. Charges are based on a fixed price per unit of capacity with various capacities available for each meter. Table 9-1 summarizes the in-City connection fees for water service.

Table 9-1 Current Water Connection Fee Schedule 1986

Meter Size, inches	Unit Capacity Value	Charge per Unit Capacity	Total Fee
3/4	1.5	$322.50	$484
1	2.5	$322.50	$806
1-1/2	5.0	$322.50	$1,612
2	8.0	$322.50	$2,580
3	15.0	$322.50	$4,837
4	25.0	$322.50	$8,063
6	50.0	$322.50	$16,125
8	90.0	$322.50	$29,025

The unit capacity charge which is intended to be equal to that made by the current ratepayers is to be calculated as follows:

(CDRV-OD)/MCU=Charge per unit capacity where:
CDRV=Current depreciated replacement value
OD=Outstanding debt principal
MCU=Maximum Capacity Units

The existing ordinance states that the fee schedule shall be updated a minimum of once every three years. The fees collected can be used for water treatment facilities, water pumping stations, storage reservoirs, and water transmission and supply lines more than 12 inch diameter.

SB 185

The Montana legislators recently passed SB 185, a comprehensive law governing the imposition of impact fees. The law provides guidelines for the methodology used to calculate impact fees, establishes collection and expenditure requirements and requires that an Impact Fee Advisory Committee be established. The law requires that governmental entities currently imposing impact fees bring those fees into compliance with the Act by October 1, 2006. HDR would recommend that the City seek an opinion from legal counsel as to whether or not they are subject to the new law.

Overview of the City's Methodology

The City's current methodology for the calculation of system development charges is consistent with generally accepted methods. As stated in the American Water Works association Manual of Water Supply Practices, Principles of Water Rates, Fees, and Charges (AWWA M1):

> *"The goal of the equity method is to achieve an equity position between new and existing customers of the system. The method assumes that existing customers have provided equity in the existing system and the built-up equity should accrue to benefit existing customers. Under the equity method, the base level of the SDC is established at the current level of system equity related to the capacity used to serve an existing equivalent residential customer. This approach is most appropriate where current system facilities adequately serve existing and future customers, where no new significant system investment is anticipated, and where existing facilities are not schedule for replacement in the near future.", page 201.*

In determining the SDC under the City's current methodology, the City needs to use caution in determining the maximum capacity units to assure that number of units the system will serve is consistent with the assets that are being used in the calculation. As an example, if the assets used in the calculation will serve saturation **development, then the maximum capacity units used need to be saturation units.**

The use of depreciated replacement cost is a generally accepted method to value assets that will provide service to new customers. However, if the City is subject to SB 185, this may not be allowed. SB 185 Section 2 (3) states *"The amount of each impact fee must be based on the actual cost of public facility expansion or improvements …"* .

Other Calculation Methods

The buy-in or equity method described in the existing method is one way to calculate an appropriate system development fee. The existing methods calculates the replacement cost of the all the existing infrastructure, subtracts out the existing debt and divides by the total number of users.

An alternate approach would be to an incremental cost method. In this approach new development pays for future facilities built solely to provide capacity to serve them. In Chapter 9, capital projects needed to serve future growth are identified. The total estimated cost of growth related distribution system improvements is $34,000,000. These projects are primarily to the North and East where the City is expanding. Improvements at the treatment plants were not categorized as growth-related because the capacity of the existing plant is increasing only slightly. Therefore, in this scenario, those improvements would be funded by the entire rate base.

The growth-related improvements listed are estimated to serve approximately 32,000 new City users. Since the growth areas are primarily residential, for the purposes of this analysis 2.5 person per connections are assumed along with a ¾ inch water service. Calculated this way, the system development fee for a ¾ inch service would be $2,656. This value matches well with what Bozeman and Kalispell are currently charging for ¾ inch service connections.

Another approach would be a combination of the buy-in method and incremental cost method. In this method, new development pays an average share of existing and future facilities spread over the current and projected ratepayers the system will serve. This approach assumes that existing and future customers are equal beneficiaries of both the current and future system. Therefore, existing and future customers share equally the burden of financing all system facilities. A discussion of this method is provided at an attachment.

Comparison of Existing Fees with Other Montana Cities

Bozeman, Billings and Kalispell have completed detailed studies to determine what their connection fees should be to ensure that growth pays for itself. The City of Great Falls has very low connection charges. Butte Silver Bow and Missoula's water utility (Mountain Water Company -a private water purveyor) do not charge connection fees. These cities are not using connection fees or impact fees as a way to make growth pay its own way. Rather, the existing rate base is subsidizing growth in these areas. Table 9-2 shows where Helena's connection fees fall relative to other Montana cities. In all five sizes listed, Helena is fourth out of the seven, but far below the cost of the City ranked third.

Table 9-2 Water Connection Fee for other Montana Cities

Rank		Connection Fee	Rank		Connection Fee	Rank		Connection Fee
¾" Meter			**1" Meter**			**1-1/2" Meter**		
1	Kalispell	$2,746.00	1	Bozeman	$6,574.51	1	Bozeman	$13,149.02
2	Bozeman	$2,629.80	2	Kalispell	$4,576.00	2	Kalispell	$9,152.00
3	Billings	$1,779.00	3	Billings	$4,448.00	3	Billings	$8,895.00
4	**Helena**	**$484.00**	**4**	**Helena**	**$806.00**	**4**	**Helena**	**$1,612.00**
5	Great Falls	$275.00	5	Great Falls	$306.00	5	Great Falls	$372
6	Butte	$0	6	Butte	0	6	Butte	$0

7	Missoula	Not allowed	7	Missoula	Not allowed	7	Missoula	Not allowed
2" Meter			**4" Meter**					
1	Bozeman	$21,038.44	1	Bozeman	$65,745.12			
2	Kalispell	$14,643.00	2	Billings	$44,475.00			
3	Billings	$14,230.00	3	Kalispell	$29,285.00			
4	**Helena**	**$2,580.00**	**4**	**Helena**	**$8,063.00**			
5	Great Falls	$403.00	5	Great Falls	$780.00			
6	Butte	$0	6	Butte	$0			
7	Missoula	Not allowed	7	Missoula	Not allowed			

Other Montana Cities System Development Fee Ordinance Language

Most Montana cities do not have the calculation described above to determine system development fees. Rather, system development fee language in Great Falls, Kalispell and Billings are kept general and allow the Commission or City governing body to determine appropriate fees. Text from the Billings ordinance is shown below. Great Falls and Kalispell have similar language.

"The City of Billings is authorized to regulate the City's municipal water and wastewater utility and to change rates, fees and changes as may be deemed by the City Council to be reasonable and just…"

System Development Fee Study

The City should complete a water rate study that follows the approach to the analysis outlined above. A modified rate structure should be developed where appropriate.